Appendix M. Regional Economic Impacts of Current and Proposed Management Alternatives for Deer Flat National Wildlife Refuge

DRAFT for REVIEW

USGS
science for a changing world

Regional Economic Impacts of Current and Proposed Management Alternatives for Deer Flat National Wildlife Refuge

By Lynne Koontz, Catherine M. Cullinane Thomas, and Erik Larsen

Introduction

The National Wildlife Refuge System Improvement Act of 1997 requires all units of the National Wildlife Refuge System to be managed under a Comprehensive Conservation Plan (CCP). The CCP must describe the desired future conditions of a Refuge and provide long range guidance and management direction to achieve refuge purposes. The Deer Flat National Wildlife Refuge (Refuge) is in the process of developing a range of management goals, objectives, and strategies for the CCP. The CCP must contain an analysis of expected effects associated with current and proposed Refuge management strategies.

For CCP planning, a regional economic analysis provides a means of estimating how current management (No Action Alternative) and proposed management activities (Action Alternatives) affect the local economy. This type of analysis provides two critical pieces of information: 1) it illustrates the Refuge's contribution to the local community; and 2) it can help in determining whether economic effects are or are not a real concern in choosing among management alternatives.

It is important to note that the economic value of the Refuge encompasses more than just the impacts on the regional economy. The Refuge also provides substantial nonmarket values (values for items not exchanged in established markets) such as maintaining endangered species, preserving wetlands, educating future generations, and adding stability to the ecosystem (Carver and Caudill, 2007). However, quantifying these types of nonmarket values is beyond the scope of this study.

This report first presents a description of the local communities and economy near the Refuge. Next, the methods used to conduct a regional economic impact analysis are described. An analysis of the final CCP management strategies that could affect stakeholders and residents and the local economy is then presented. The management activities of economic concern in this analysis are:

- Purchases of goods and services within the local community;
- Personnel salary spending;
- Revenues generated from Refuge Revenue Sharing; and
- Spending in the local community by Refuge visitors

Regional Economic Setting

Located southwest of Boise, Idaho, the Refuge has two units, Lake Lowell and the Snake River Islands. The Lake Lowell Unit encompasses more than 10,500 acres, including the almost 9,000-acre Lake Lowell and surrounding lands. The Snake River Islands Unit contains about 1,200 acres on over 100 islands. These islands are distributed along 113 river miles from the Canyon-Ada County Line in Idaho to Farewell Bend in Oregon.

Refuge visitors can enjoy a variety of wildlife-dependent recreational activities, (i.e., wildlife-watching and photography, hunting, fishing, and environmental education and interpretation), as well as non-wildlife dependent recreational activities, including recreational boating, horseback riding, and dog walking. These recreational opportunities attract outside visitors and bring in dollars to the community. Associated visitor activities—such as spending on food, gasoline, and overnight lodging in the area—provides local businesses with supplemental income and increases the local tax base. Management decisions for the Refuge about public use, expansion of services, and habitat improvement may either increase or decrease visitation to the complex and, thus, affect the amount of visitor spending in the local economy.

For the purposes of an economic impact analysis, a region (and its economy) is typically defined as all counties within a 30-60 mile radius of the impact area. Only spending that takes place within this regional area is included as stimulating changes in economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. After consultation with the Refuge staff, it was decided that only the Lake Lowell Unit would be considered for the economic analysis due to the relatively small amount of visitation to the Snake River Islands Unit. The Lake Lowell Unit lies within Canyon County, Idaho. The city of Boise, located in Ada County, is approximately 28 miles from the Refuge. Most of the economic activity related to the Lake Lowell Unit is located within Canyon and Ada counties. Therefore, this two-county area comprises the local economic region for this analysis. The next sections describe the socioeconomic characteristics and trends in the two-county region.

Population and Density

Table 1 summarizes the population characteristics of Idaho and the local two-county area. In 2010, the U.S. Census Bureau estimated the total population for the two counties to be 581,288, or 37% of Idaho's total population. Ada County was the most heavily populated county in both the study area and the state with 392,365 residents in 2010. Canyon County (188,923 residents) was the second most populous county of the state in this same year (United States Census Bureau, 2012; Idaho Department of Labor, 2011a; Idaho Department of Labor, 2011b). In the years leading up to the economic recession of the late 2000s, the two-county area experienced rapid population growth, with the respective populations of Ada and Canyon Counties increasing by 24% and 36% between the years of 2000 and 2008 (United States Census Bureau, 2012). The rapid population growth in the study area throughout the majority of the past decade has been motivated by several factors, including a healthy labor market, relatively low real estate prices, ample opportunity for outdoor recreation, and easy access to the Boise Metro Area (Idaho Department of Labor, 2011b; Cauchon, 2007).

Table 1. Population Estimates for the State and Counties Near the Refuge

Area	Population (2010)†	% Change (2000-2010)†	Persons per Square Mile (2010) †	Expected Population Growth (2010-2030) ‡
Idaho	1,567,582	21.1%	19	31%
Ada County	392,365	30.4%	373	42%
Canyon County	188,923	43.7%	322	34%

Source: † (United States Census Bureau, 2012) and ‡ (Church, 2003)

In the final two years of the decade, population growth in the study area slowed due to repercussions of the national economic recession, with the populations of Ada and Canyon Counties averaging only 2.0% and 3.0% growth, respectively, during these years (United States Census Bureau, 2012). Despite slowed growth from 2008 to 2010, the Treasure Valley and Boise Metro Area remain among some of the fastest growing regions of the state over the past decade; they are expected to continue to be so over the coming decades (Bureau of Economic Analysis, 2010; Church, 2003).

In 2010, the population densities of both counties in the region were between 300-400 persons per square mile, with Ada County being more densely populated (373 persons per square mile) than Canyon County (322 persons per square mile) (United States Census Bureau, 2012). Both counties had substantially higher population densities than the state of Idaho as a whole (nineteen persons per square mile in 2010). In the case of Ada County, the high population density is largely due to the city of Boise, which accounted for over half (52%) of the county's 2010 populace (United States Census Bureau, 2012). Similarly, the cities of Nampa (81,557 residents) and Caldwell (46,237 residents) collectively accounted for 68% of the population of Canyon County in 2010 (United States Census Bureau, 2012). Rural areas are more sparsely populated than the data shown in Table 1.

Population Projections

Future population projections for the two-county area as well as the state of Idaho are characterized by in-migration over the next twenty years. The population of Idaho is expected to increase by 31% over the course of the next two decades, and, by 2030, it is projected to reach nearly two million (Church, 2003). During these years, Idaho is anticipated to be one of the fastest growing states, with growth rate projections consistently among the top ten in the nation (United States Census Bureau, 1996). In 2010, the most populated regions in Idaho included parts of the Treasure Valley and Boise Metro Regions (i.e., Ada and Canyon Counties) (United States Census Bureau, 2012). These regions, which correspond to some of the state's largest population centers (e.g., the cities of Boise, Nampa, Caldwell), are expected to remain the most populated areas statewide over the next two decades. The Treasure Valley and Boise Metro Region is expected to be the fastest growing region in the state over the next twenty years, with Valley, Boise, Ada, and Canyon Counties averaging a growth rate of 42% over this time horizon. The two counties that make up the study area are expected to remain among the fastest growing counties in the state, with Ada and Canyon Counties projected to be the first and eighth fastest growing counties statewide over the next two decades (Church, 2003).

Gender, Age and Racial Composition

In 2010, the median age of residents in Canyon County (31.6 years) was lower than the state median of 34.6 years and the Ada County median of 34.8 years (United States Census Bureau, 2012) (United States Census Bureau, 2012). In 2010, the racial demographics of Ada County were very similar to those of the state (Table 2). In Canyon County the percentage of Hispanic or Latino residents was approximately 13% higher while the percentage of white residents was 6% lower than the state average (United States Census Bureau, 2012).

Table 2. Racial Demographics for the State and Counties Near the Refuge (2010)

Area	**Idaho**	**Ada County**	**Canyon County**
		% of Total Population	
White alone	89.0%	90.3%	83.0%
Hispanic or Latino	11.2%	7.1%	23.9%
Two or more races	2.5%	2.9%	3.0%
Asian alone	1.2%	2.4%	0.8%
Black or African American alone	0.6%	1.1%	0.6%
American Indian and Alaska Native alone	1.4%	0.7%	1.0%
Native Hawaiian and other Pacific Islander alone	0.2%	0.2%	0.2%

Source: (United States Census Bureau, 2012)

Economic Conditions and Trends

Unemployment and Poverty

Since the early 1990s, trends in the unemployment rate in the state of Idaho have generally paralleled the national average, with unemployment trending downward in the late 1990s to reach levels below the national average by the mid-2000s before increasing again in the latter half of the same decade (Bureau of Labor Statistics, 2011a). The period of expansion in the early 2000s may be attributed to several factors, including the growth of several service industries, the continued development of the state's technology sector, and increasing demand for local government and construction services as the state's population continued to grow (Idaho Division of Financial Management, 2004). In 2008, Idaho's unemployment rate trended sharply upward as the state began to feel the recessionary effects of a sluggish national economy, with the construction, manufacturing, financial services, administrative and support services, and retail trade industries suffering the greatest job losses in the state's economy (Idaho Department of Labor, 2011c; Idaho Department of Labor, 2009). Since 1990, unemployment in the study area exhibited similar trends as statewide unemployment, with Ada County and Canyon County averaging unemployment rates of 4.0% and 5.8%, respectively, over the past two decades (Bureau of Labor Statistics, 2011a). Between 2008 and 2010, unemployment in the two-county area saw a sharp increase, particularly in Canyon County where the combined effects of slowed population growth, a struggling housing market, and rising lumber, concrete, and fuel prices decreased the local demand for labor (Idaho Department of Labor, 2011a).

Table 3 summarizes measures of unemployment, poverty, and income in the two-county area. In 2010, the median household income in Idaho as a whole was $43,490, which was about $6,500 lower than the national median household income of $50,046 (United States Census Bureau, 2012). Median household income in the region averaged $46,672, with the median income in Ada County ($50,612) being substantially higher than that in Canyon County ($42,732).

Table 3. Unemployment, Poverty, and Household Income for the State and Counties Near the Refuge

Area	Median Household Income 2010	Unemployment Rate 2010	Net Change in Unemployment Rate 2007-2010	Percent of Persons Below Poverty 2010
Idaho	$43,490	9.5%	6.5%	25.0%
Ada County	$50,612	8.9%	6.4%	29.8%
Canyon County	$42,732	11.3%	7.8%	16.2%

Source: United States Census Bureau, 2012

As shown in Table 3, poverty levels in Canyon County (16.2%) were below the state average of 25% in 2010. In contrast, poverty levels in Ada County (29.8%) were greater than the state average in 2010. The two-county area averaged 23% of its population below the 2010 poverty line (United States Census Bureau, 2012).

Employment and Income by Industry

Table 4 summarizes employment by industry for the two-county area. In 2009, total employment in the local area represented 339,730 jobs with about 77% of these jobs located in Ada County. Sixty percent of the total employment in the study area came from five main sectors (Bureau of Economic Analysis, 2010): professional, scientific, management, administration, and waste services; educational, health, and social services; retail trade; finance, insurance, real estate, and rental and leasing; and public administration. In 2008, the two largest employers in Ada County were Micron Technology and Hewlett Packard; these companies remain some of the largest local employers in Ada County (Ada County Accounting Department, 2008; Idaho Department of Labor, 2011b). In Canyon County, the largest local employers in the past decade have been in the education, manufacturing, health care, food processing, and wood processing sectors. These employers currently include the Caldwell and Nampa School Districts, the St. Alphonsus Medical Center, Plexus, the Amalgamated Sugar Company, and Woodgrain Milwork Incorporated (Idaho Department of Labor, 2011a; City of Nampa Department of Planning and Zoning, 2003).

Professional, scientific, management, administration, and waste services accounted for the largest percentage of total employment in the region, with 15.6% of total local employment coming from this sector. In the two-county area, most jobs in education, health, and social services (77%) and public administration (87%) were located in Ada County, which is home to both the state capital and Boise State University. These sectors were the second and fifth largest sectors of the local economy, respectively, and accounted for 13.1% and 10.3% of total employment in the combined two-county area (Bureau of Economic Analysis, 2010).

On the whole, farm employment accounted for a relatively small share (1.5%) of total employment in the region. Employment from this sector, however, did account for a larger share of total employment located in Canyon County (4% of total in-county employment) than Ada County (less than one percent). On the whole, Ada County was much less dependent on farm earnings (less than one percent of total in-county farm earnings) than the state as a whole, which had about 4.0% of its total earnings coming from farming; the opposite is true of Canyon County, which had 4.7% of its total earnings from farming (Bureau of Economic Analysis, 2010).

Table 4. Employment by Industry for the Counties Near the Refuge

	Ada County	Canyon County	Two-County Area
Total Employment (jobs) in 2009	**262,868**	**78,862**	**339,730**
Percent of Employment by Sector			
Professional, scientific, management, admin., and waste services	17%	9%	16%
Educational, health, and social services	13%	13%	13%
Retail trade	11%	13%	11%

Finance, insurance, real estate, and rental & leasing	11%	8%	10%
Public administration	10%	11%	10%
Arts, entertainment, recreation, accommodation, and food services	9%	6%	8%
Manufacturing	6%	10%	7%
Construction	6%	8%	7%
Other Services (except public administration)	5%	6%	5%
Wholesale trade	4%	3%	4%
Transportation and Warehousing	2%	4%	3%
Agriculture, forestry, fishing and hunting, and mining	1%	6%	2%
Information Services	2%	1%	2%

Source: (Bureau of Economic Analysis, 2010)

Land Use and Ownership Changes Surrounding Refuge Lands

Current Land Use

Idaho's Treasure Valley lies within a flat lowland known as the Snake River Plain. The Treasure Valley stretches across the southwest corner of the state and is bounded by the Boise Front Range to the northeast and the Owyhee Mountains to the southwest (Petrich, Wilkins, Tondee, & Morse, 2002). This valley closely coincides with the two-county study area, and it houses some of Idaho's largest metropolitan areas, including the cities of Boise, Caldwell, and Nampa, which collectively accounted for about 21% of the state's 2010 population (United States Census Bureau, 2012). As of 2008, about 30% of the land in the two-county area near the Refuge was federally owned, with the majority of federal land ownership accounted for by Bureau of Land Management holdings (21% of all land in the two-county area). About 65% of the land in the study area was privately owned and the remaining 4% was State-owned (Conservation Biology Institute, 2006 [data complied using the Economic Profile System-Human Dimensions Toolkit (EPS-HDT) developed by Headwaters Economics]).

Ada County is largely covered by grassland and shrubland, which account for about 75% of all land cover in the County. Mixed cropland is also prevalent, accounting for 17% of the land cover (NASA, 2006 [data complied using EPS-HDT]). As of 2008, urban development accounted for 6% of all land cover in the County, with the greater Boise area (i.e., the cities of Boise, Eagle, Garden City, Kuna, Meridian, and Star) accounting for 332,646 residents, or about 85% of the county's total 2010 population (United States Census Bureau, 2012). Land ownership in Ada County in 2008 was 49% private, 43% Federal, 7% State, and 1% under other ownership (*i.e.* Tribal, City, County, or Other) (Conservation Biology Institute, 2006 [data complied using EPS-HDT]).

Canyon County is less urbanized with about 3% of the county's land cover being urban development in 2008. Mixed croplands accounted for about 75% of the county's land cover, grassland accounted for 14%, and shrubland accounted for 4% (NASA, 2006 [data complied using EPS-HDT]). Water

accounted for an additional 2% of land cover in Canyon County with the majority of this coming from Lake Lowell, which covers a total of 14.5 square miles of the county's land (NASA, 2006 [data complied using EPS-HDT]; United States Bureau of Reclamation, n.d.). In 2010, the largest municipalities in Canyon County included Nampa (81,557 residents), Caldwell (46,237 residents), and Middleton (5,524 residents), which collectively accounted for about 34% of the county's total population (United States Census Bureau, 2012). Land ownership in Canyon County in 2008 was 93% private, 6% Federal, 5% State owned, and 1% under other ownership (*i.e.* Tribal, City, County, or Other) (Conservation Biology Institute, 2006 [data complied using EPS-HDT]).

Changes in Land Use

As populations grow, the spread of American cities across the rural landscape has several potential environmental impacts including, for example, decreased watershed permeability, increased noise and air pollution, and the loss of arable land and open spaces (McMahan, Weber, & Sauder, 2002). In addition to these environmental impacts, urban sprawl may have significant economic impacts on local communities through increased costs of public community services such as emergency response, infrastructure, or public works and utilities (Chen, 2000; Speir & Stephenson, 2002). Population growth in Idaho over the past decades has been cause for the continued conversion of rural lands to urban purposes. Between 1982 and 1997, Idaho ranked 35th in the nation for the most rural acres converted for urban growth purposes, with 205,000 acres of rural land being converted (Goodwin, 2003). About half (45%) of this transformation took place between 1992 and 1997, with over 27,000 of these acres occurring in the two-county study area during this five year period. Land conversion in Ada and Canyon Counties between 1992 and 1997 occurred faster than in any other region in Idaho, with Ada County converting land at a rate of 4,480 acres per year and Canyon County averaging 2,600 acres per year (United States Department of Agriculture, 2000). Between 1997 and 2007, an additional 130,100 acres of land was developed statewide, resulting in 557,600 total acres of developed land in Idaho and representing a 61% increase from 1982 levels (United States Department of Agriculture, 2009). These trends of urbanization and sprawl are likely to continue in the future as statewide and local area populations are projected to continue growing over the next few decades.

Economic Impacts of Current and Proposed Management Activities

Methods for a Regional Economic Impact Analysis

Economic input-output models are commonly used to determine how economic sectors will and will not be affected by demographic, economic, and policy changes. The economic impacts of the management alternatives for the Refuge were estimated using IMPLAN (Impact Analysis for

Planning), a regional input-output modeling system developed by the USDA Forest Service. IMPLAN is a computerized database and modeling system that provides a regional input-output analysis of economic activity in terms of 10 industrial groups involving more than four hundred economic sectors (Olson and Lindall, 1999). The IMPLAN model draws upon data collected by the Minnesota IMPLAN Group from multiple federal and state sources including the Bureau of Economic Analysis, Bureau of Labor Statistics, and the U.S. Census Bureau (Olson and Lindall, 1999). For the Refuge analysis, the year 2009 IMPLAN 3.0 data profiles for Ada and Canyon counties were used for the local area analysis. The IMPLAN county level employment data estimates were found to be comparable to the US Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System data for the year 2009.

Because of the way industries interact in an economy, activity in one industry affects activity levels in several other industries. For example, if more visitors come to an area, local businesses will purchase extra labor and supplies to meet the increase in demand for additional services. The income and employment resulting from visitor purchases from local businesses represent the *direct* effects of visitor spending within the economy. Direct effects measure the net amount of spending that stays in the local economy after the first round of spending; the amount that doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2007). In order to increase supplies to local businesses to meet increased demand, input suppliers must also increase their purchases of inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the *indirect* effects of visitor spending within the economy. Employees of the directly affected businesses and input suppliers use their incomes to purchase goods and services. The resulting increased economic activity from new employee income is the *induced* effect of visitor spending. The indirect and induced effects are known as the secondary effects of visitor spending. "Multipliers" (or "Response Coefficients") capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes, 1998). The sums of the direct and secondary effects describe the total economic impact of visitor spending in the local economy.

For each alternative, regional economic effects from the IMPLAN model are reported for the following categories:

- **Employment** represents the change in the number of jobs generated in the region from a change in regional output. IMPLAN estimates for employment include both full time and part time workers, which are measured in total jobs.
- **Labor Income** includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- **Value Added** measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

This economic impact analysis provides the potential economic effects associated with the implementation of the management alternatives for the Deer Flat National Wildlife Refuge. The CCP provides long range guidance and management direction to achieve the Refuge purposes over a 15-year timeframe. The planning team developed and analyzed four alternatives including current management. The economic impacts reported in this report are on an annual basis in 2011 dollars. Large management changes often take several years to achieve. The estimates reported for all the alternatives represent the final average annual economic effects after all changes in management have been implemented.

Impacts from Refuge Revenue Sharing

Under provisions of the Refuge Revenue Sharing (RRS) Act, local counties receive an annual payment for lands that have been purchased by full fee simple acquisition by the Service. Payments are based on the greater of 75 cents per acre or 0.75% of the fair market value of lands acquired by the Service. The exact amount of the annual payment depends on Congressional appropriations, which in recent years have tended to be less than the amount to fully fund the authorized level of payments. In fiscal year 2010 (FY10), actual RRS payments were 21% of authorized levels. FY10 RRS payments (made in 2011) totaled $4,547 to communities in Canyon County. Table 5 shows the resulting economic impacts of RRS payments under all alternatives. Accounting for both the direct and secondary effects, RRS payments for Alternatives 1, 2, 3, and 4 would generate total annual economic impacts of $1.9 thousand in labor income and $2.8 thousand in value added in the local two-county area.

Table 5. Annual Impacts from Refuge Revenue Sharing Payments for all Alternatives.

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternatives 1, 2, 3, and 4			
Direct effects	0	$1.4	$1.8
Secondary effects	0	$0.5	$1.0
Total economic impact	0	$1.9	$2.8

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The FWS report Banking on Nature: The Economic Benefits of National Wildlife Refuges

Visitation to Local Communities, estimated the impact of national wildlife refuges on their local economies (Carver and Caudill, 2007). According to the report, more than 34.8 million visits were made to national wildlife refuges in FY 2006 which generated $1.7 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by national wildlife refuge visitors generated nearly 27,000 jobs, and over $542.8 million in employment income (Carver and Caudill, 2007). Approximately eighty-two percent of total expenditures were from non-consumptive activities, twelve percent from fishing, and six percent from hunting (Carver and Caudill, 2007).

The priority "Big-Six" wildlife dependent uses are offered on the Lake Lowell Unit including: hunting, fishing, wildlife observation and photography, interpretation, and environmental education. Additionally, several other non-priority uses occur on the Refuge including non-wildlife dependent boating, swimming, jogging, and picnicking.

This section focuses on the regional economic impacts associated with Refuge visitation. Annual visitation estimates are based on several Refuge statistic sources including: visitors entering the Visitor Center/Office, counting vehicles at dispersed access sites, and general observation by Refuge personnel. Annual visitation estimates are on a per visit basis. Visitor spending profiles are estimated on an average per day (8 hours) basis. Because some visitors only spend short amounts of time visiting the Refuge, counting each visit as a full visitor day would overestimate the economic impact of Refuge visitation. In order to properly account for the amount of spending, the annual number of visits were converted to visitor days. Results from a recent visitor survey conducted during the summer of 2011(Sexton et. al., 2012) showed that Refuge visitors spend on average: five hours for fishing and non-wildlife dependent boating; four hours for swimming; and three hours for wildlife related non-consumptive activities (wildlife watching & photography, environmental education, and interpretation) and land-based non-wildlife dependent activities (walking, jogging, picnicking). Refuge personnel estimate that big game and waterfowl hunters spend six hours while upland game and other migratory bird hunters spend approximately 4 hours on the Refuge.

To determine the local economic impacts of visitor spending, only spending by persons living outside of the local two-county area are included in the analysis. The rationale for excluding local visitor spending is twofold. First, money flowing into Ada and Canyon counties from visitors living outside the local area (hereafter referred to as non-local visitors) is considered new money injected into the local economy. Second, if residents of the local two-county area visit the Refuge more or less due to the management changes, it is likely that they will correspondingly change the spending of their money elsewhere in that local area, resulting in no net change to the local economy. These are standard assumptions made in most regional economic impact analyses at the local level. However, it is possible that potential Refuge management actions that would restrict boating and other non-priority recreation at the Refuge could result in visitors from the local area shifting their expenditures from Canyon County to Ada County or possibly going outside of Ada and Canyon counties to boat and recreate at reservoirs outside of the two-county area. To address the contribution of local Refuge

visitation, Appendix A provides a contribution analysis of local visitor expenditures in the two-county area. Refuge personnel determined the percentage of non-local Refuge visitors based on . Table 6 shows the estimated percent of current Refuge visits and visitor days by visitor activity.

Table 6. Estimated Current Annual Refuge Visitation.

Visitor Activity	Total annual number of visits	Number of hours spent at the Refuge	Total annual number of visitor days[a]	Percentage of non-local visits (%)	Number of non-local visitor days[a]
Priority Uses:					
Fishing	45,300	5	28,313	7%	1,982
Big game hunting	75	6	56	8%	5
Waterfowl hunting	5,000	6	3,750	8%	300
Other migratory bird hunting (mourning dove)	100	4	50	8%	4
Upland game hunting	1,100	4	550	8%	44
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	55,900	3	20,963	10%	2,096
Non-priority uses:					0
Non-wildlife dependent boating	49,400	5	30,875	13%	4,014
Swimming and other beach activities	38,700	4	19,350	13%	2,516
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking))	27,800	3	10,425	13%	1,355
Total Visitation	*223,375*		*114,331*		*12,315*

[a]One visitor day = 8 hours.

The Refuge staff used several sources to project changes in visitation by activity over the next 15 years for each alternative. The Refuge staff estimated visitor projections based on the following considerations: Idaho and national visitation trend data; changes in recreational programs, facilities, and resources under each alternative; and changes observed in visitation at Deer Flat NWR over the last 10 years (Refuge staff experience/judgment). Table 7 shows projected annual average number of visits and visitor days for each activity and alternative.

Table 7. Annual Average Number of Refuge Visits and Visitor Days by Activity and Alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Total Visits				
Priority Uses:				
Fishing	48,430	48,430	23,260	12,710

Big game hunting	125	125	125	125
Waterfowl hunting	5,350	5,350	3,090	4,280
Other migratory bird hunting (mourning dove)	110	110	50	40
Upland game hunting	1,180	1,180	550	410
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	93,410	125,560	123,080	103,850
Non-priority uses:				
Non-wildlife dependent boating	55,080	50,040	21,480	0
Swimming and other beach activities	60,290	54,260	40,700	0
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	32,280	30,970	27,140	11,500
Total Annual Visits	*296,255*	*316,025*	*239,475*	*132,915*
Total Visitor Days				
Priority Uses:				
Fishing	30,269	30,269	14,538	7,944
Big game hunting	94	94	94	94
Waterfowl hunting	4,013	4,013	2,318	3,210
Other migratory bird hunting (mourning dove)	55	55	25	20
Upland game hunting	590	590	275	205
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	35,029	47,085	46,155	38,944
Non-priority uses:				
Non-wildlife dependent boating	34,425	31,275	13,425	0
Swimming and other beach activities	30,145	27,130	20,350	0
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	12,105	11,614	10,178	4,313
Total Visitor Days	*146,724*	*152,124*	*107,356*	*54,729*
Non-local Visitor Days				
Priority Uses:				
Fishing	2,119	2,119	1,018	556
Big game hunting	8	8	8	8
Waterfowl hunting	321	321	185	257
Other migratory bird hunting (mourning dove)	4	4	2	2
Upland game hunting	47	47	22	16
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	3,503	4,709	4,616	3,894
Non-priority uses:				
Non-wildlife dependent boating	4,475	4,066	1,745	0
Swimming and other beach activities	3,919	3,527	2,646	0
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	1,574	1,510	1,323	561
Total Non-local Visitor Days	15,970	16,310	11,564	5,293

A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis we use average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill, 2007) that were derived from the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (U.S. Fish and Wildlife Service, 2007). The National Survey reports trip related spending of state residents and non-residents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person per-day expenditures by recreation activity for each FWS region. We used the spending profiles for nonresidents for FWS Region 1 (Region 1 includes Idaho), and updated the 2006 spending profiles to 2011 dollars using the Consumer Price Index Inflation Calculator. Average daily spending profiles for nonresident visitors to Region 1 for fishing ($65.98 per-day), big game hunting ($94.98 per-day), upland game hunting ($172.41 per-day) and waterfowl hunting ($192.73 per-day) were used to estimate non-local visitor spending for Refuge fishing and hunting related activities. The average daily nonresident spending profile for non-consumptive wildlife recreation (observing, feeding, or photographing fish and wildlife) ($121.59 per-day) was used for all non-consumptive wildlife viewing activities including non-priority swimming and beach activities and land-based non-wildlife dependent activities.

Banking on Nature does not include a spending profile for boating. To account for expenditures by boaters, it was assumed that boaters have similar expenditures to other non-consumptive wildlife recreators, but have additional fuel expenses to power their motor boats. Based on this assumption, the boater spending profile for this analysis was constructed by adding average daily boating fuel expenditure costs to the average daily nonresident spending profile for non-consumptive wildlife recreation from the Banking on Nature report. Average daily boating fuel expenditures per party were estimated by multiplying the average outboard fuel consumption for 2- and 4-stroke boats (3.2 gallons/hour; Nissan Marine, 2012) by the U.S. average conventional retail gasoline prices for the summer of 2011 (May-August) ($3.68; U.S. Energy Information Administration, 2012). Average daily boating fuel expenditures per person were then calculated by dividing average daily boating fuel expenditures per party by the average number of persons in a boating party (4 persons/party; Sexton et. al., 2012). This resulted in an average daily boating fuel expenditure of $23.57 per-day and total nonresident daily boating expenditures of $145.16 per-day.

Total spending by non-local Refuge visitors was determined by multiplying the average non-local visitor daily spending by the number of non-local visitor days at the Refuge. The economic impacts of each alternative were estimated using IMPLAN. Table 8 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 1. Under Alternative 1, non-local Refuge visitors would spend approximately $1.95 million in the local economy annually. This

spending would directly account for 19 jobs, $538.2 thousand in labor income, and $877.6 thousand in value added in the local economy. The secondary or multiplier effects would generate an additional 9 jobs, $309.6 thousand in labor income, and $546.2 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 1 would generate total economic impacts of 28 jobs, $847.8 thousand in labor income, and $1.4 million in value added.

Table 8. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 1.

Alternative 1	**Employment** (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	1	$36.4	$58.7
Secondary effects	1	$20.8	$36.6
Total effect	*2*	*$57.1*	*$95.3*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	1	$17.9	$28.6
Secondary effects	0	$9.8	$17.3
Total effect	1	$27.6	$45.8
Non-Consumptive (wildlife watching & photography, env. education, and interpretation)			
Direct effects	4	$111.4	$182.1
Secondary effects	2	$67.7	$118.9
Total effect	*6*	*$179.1*	*$301.0*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	7	$197.9	$322.6
Secondary effects	3	$105.3	$187.0
Total effect	*10*	*$303.1*	*$509.6*
Swimming and other beach activities			
Direct effects	4	$124.7	$203.8
Secondary effects	2	$75.7	$133.0
Total effect	*6*	*$200.4*	*$336.8*
Land-based non-wildlife dependent (walking, jogging, and other activities, e.g., picnicking)			
Direct effects	2	$50.1	$81.8
Secondary effects	1	$30.4	$53.4
Total effect	*3*	*$80.5*	*$135.2*
Aggregate Non-local visitation			
Direct effects	19	$538.2	$877.6
Secondary effects	9	$309.6	$546.2
Total effect	*28*	*$847.8*	*$1,423.8*

Table 9 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 2. Under Alternative 2, non-local Refuge visitors would spend approximately $1.99 million in the local economy annually. This spending would directly account for 19 jobs, $543.9 thousand in labor income, and $887.1 thousand in value added in the local economy. The secondary or

multiplier effects would generate an additional 10 jobs, $314.4 thousand in labor income, and $554.6 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 2 would generate total economic impacts of 29 jobs, $858.4 thousand in labor income, and $1.4 million in value added.

Table 9. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 2.

Alternative 2	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	1	$36.4	$58.7
Secondary effects	1	$20.8	$36.6
Total effect	*2*	*$57.1*	*$95.3*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	1	$17.9	$28.6
Secondary effects	0	$9.8	$17.3
Total effect	*1*	*$27.6*	*$45.8*
Non-Consumptive (wildlife watching & photography, env.l education, and interpretation)			
Direct effects	5	$149.8	$244.8
Secondary effects	3	$91.0	$159.8
Total effect	*8*	*$240.7*	*$404.7*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	6	$179.8	$293.1
Secondary effects	3	$95.6	$169.9
Total effect	*9*	*$275.4*	*$463.0*
Swimming and other beach activities			
Direct effects	4	$112.2	$183.4
Secondary effects	2	$68.1	$119.7
Total effect	*6*	*$180.3*	*$303.1*
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)			
Direct effects	2	$48.0	$78.5
Secondary effects	1	$29.2	$51.3
Total effect	*3*	*$77.2*	*$129.8*
Aggregate Non-local visitation			
Direct effects	19	$543.9	$887.1
Secondary effects	10	$314.4	$554.6
Total effect	*29*	*$858.4*	*$1,441.6*

Table 10 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 3. Under Alternative 3, non-local Refuge visitors would spend approximately $1.4 million in the local economy annually. This spending would directly account for 13 jobs, $377.8

thousand in labor income, and $616.6 thousand in value added in the local economy. The secondary or multiplier effects would generate an additional 6 jobs, $222.4 thousand in labor income, and $391.6 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 3 would generate total economic impacts of 19 jobs, $600.1 thousand in labor income, and $1 million in value added.

Table 10. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 3.

Alternative 3	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	1	$17.5	$28.2
Secondary effects	0	$10.0	$17.6
Total effect	*1*	*$27.4*	*$45.8*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	0	$10.1	$16.2
Secondary effects	0	$5.5	$9.8
Total effect	*0*	*$15.6*	*$26.0*
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)			
Direct effects	5	$146.8	$240.0
Secondary effects	3	$89.2	$156.7
Total effect	*8*	*$236.0*	*$396.7*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	3	$77.2	$125.8
Secondary effects	1	$41.1	$72.9
Total effect	*4*	*$118.2*	*$198.7*
Swimming and other beach activities			
Direct effects	3	$84.1	$137.6
Secondary effects	1	$51.1	$89.8
Total effect	*4*	*$135.3*	*$227.4*
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)			
Direct effects	1	$42.1	$68.8
Secondary effects	1	$25.6	$44.9
Total effect	*2*	*$67.6*	*$113.7*
Aggregate Non-local visitation			
Direct effects	13	$377.8	$616.6
Secondary effects	6	$222.4	$391.6
Total effect	*19*	*$600.1*	*$1,008.2*

Table 11 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 4. Under Alternative 4, non-local Refuge visitors would spend approximately

$631 thousand in the local economy annually. This spending would directly account for 5 jobs, $164.5 thousand in labor income, and $268.3 thousand in value added in the local economy. The secondary or multiplier effects would generate an additional 2 jobs, $98.7 thousand in labor income, and $173.5 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 4 would generate total economic impacts of 7 jobs, $263.2 thousand in labor income, and $441.8 thousand in value added.

Table 11. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 4.

Alternative 4	**Employment** (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	0	$9.5	$15.4
Secondary effects	0	$5.5	$9.6
Total effect	*0*	*$15.0*	*$25.0*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	0	$13.3	$21.2
Secondary effects	0	$7.1	$12.7
Total effect	*0*	*$20.4*	*$33.9*
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)			
Direct effects	4	$123.9	$202.5
Secondary effects	2	$75.2	$132.2
Total effect	*6*	*$199.1*	*$334.7*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	0	$0.0	$0.0
Secondary effects	0	$0.0	$0.0
Total effect	*0*	*$0.0*	*$0.0*
Swimming and other beach activities			
Direct effects	0	$0.0	$0.0
Secondary effects	0	$0.0	$0.0
Total effect	*0*	*$0.0*	*$0.0*
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)			
Direct effects	1	$17.8	$29.2
Secondary effects	0	$10.8	$19.0
Total effect	*1*	*$28.7*	*$48.2*
Aggregate Non-local visitation			
Direct effects	5	$164.5	$268.3
Secondary effects	2	$98.7	$173.5
Total effect	*7*	*$263.2*	*$441.8*

Table 12 summarizes the total economic impacts associated with current non-local Refuge visitation by alternative. As shown in Table 12, the total annual average economic impacts for Alternative 2 would be similar to Alternative 1. The impacts for Alternative 3 would be approximately 30% less than the impacts for Alternative 1. Alternative 4 would have the largest decrease in impacts (approximately 70-75%) compared to Alternative 1.

Table 12. Average Annual Impacts of Non-Local Visitor Spending by Alternative.

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternative 1			
Direct effects	19	$538.2	$877.6
Secondary effects	9	$309.6	$546.2
Total economic impact	28	$847.8	$1,423.8
Alternative 2			
Direct effects	19	$543.9	$887.1
Secondary effects	10	$314.4	$554.6
Total economic impact	29	$858.4	$1,441.6
Alternative 3			
Direct effects	13	$377.8	$616.6
Secondary effects	6	$222.4	$391.6
Total economic impact	19	$600.1	$1,008.2
Alternative 4			
Direct effects	5	$164.5	$268.3
Secondary effects	2	$98.7	$173.5
Total economic impact	7	$263.2	$441.8

Impacts from Refuge Administration

Staff – Personal Purchases

Refuge employees reside and spend their salaries on daily living expenses in the local area, thereby generating impacts within the local economy. Household consumption expenditures consist of payments by individuals/households to industries for goods and services used for personal consumption. The IMPLAN modeling system contains household consumption spending profiles that account for average household spending patterns by income level. These profiles allow for leakage of household spending to outside the region. The IMPLAN household spending pattern for households

earning $35-50 thousand dollars per year was used to reflect the average salary of full-time permanent employees at the Refuge ($46,000 per year). Table 13 illustrates current Refuge staffing and additional positions needed under Alternatives 2, 3, and 4.

Table 13. Current Staffing and Additional Positions Needed to Implement the CCP.

Current Refuge Staff Positions (Alternative 1)
Refuge Manager
Assistant Refuge Manager
Visitor Services Manager
Wildlife Biologist
Maintenance Worker
Administrative Assistant
Office Aid
Youth Conservation Corps Leader (full-time seasonal)
Youth Conservation Corps (4 full-time seasonal positions)
Environmental Education Specialist (Intern)
Volunteer Coordinator (Intern)
Biological Science Technician (Intern)
Additional positions needed to implement the CCP (for Alt 2,3, 4)
*Biological Science Technician
*Environmental Education Specialist
*Volunteer Coordinator
Law Enforcement Officer

*If these positions were funded, the current interns would not be necessary.

Refuge personnel estimate that annual salaries total around $524.6 thousand for Alternative 1 and would increase to $711.1 thousand under Alternatives 2, 3, and 4. Table 14 shows the economic impacts associated with spending of salaries in the local two-county area by Refuge employees under all Alternatives. For Alternative 1, salary spending by Refuge personnel would generate additional secondary effects (i.e. additional non-refuge jobs in the local economy) of 4 jobs, $133.9 thousand in labor income, and $249.3 thousand in value added in the local economy. Alternatives 2,3, and 4 would generate additional secondary effects of 5 jobs, $181.5 thousand in labor income, and $338 thousand in value added in the local economy.

Table 14. Annual Local Impacts of Salary Spending by Deer Flat NWR Personnel for by Alternative.

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternative 1			

Direct effects	0	$0.0	$0.0
Secondary effects	4	$141.1	$254.7
Total economic impact	*4*	*$141.1*	*$254.7*
Alternatives 2, 3, and 4			
Direct effects	0	$0.0	$0.0
Secondary effects	6	$191.2	$345.2
Total economic impact	*6*	*$191.2*	*$345.2*

Work-related Purchases

A wide variety of supplies and services are purchased for Refuge operations and maintenance activities. Refuge purchases made in the local two-county area contribute to the local economic impacts associated with the Refuge. Major local expenditures include: supplies and services related to annual maintenance costs for trails, buildings and signage, and small equipment; auto repairs, parts, and fuel; and utilities. Current Refuge non-salary recurring expenditures average approximately $204.7 thousand per year. Average annual costs (including recurring costs and the annual average of one-time project costs over the life of the plan) are anticipated to increase by $83.8 thousand for Alternative 1, $397 thousand for Alternative 2, $832.8 thousand for Alternative 3, and $362.6 thousand for Alternative 4. Total average annual non-salary costs would total $288.5 thousand for Alternative 1, $601.7 thousand for Alternative 2, $1.04 million for Alternative 3, and $567.3 thousand for Alternative 4. The large increase in costs under Alternative 3 are related to the construction of a boardwalk. According to Refuge records, approximately 80% of the annual non-salary budget expenditures are spent on goods and services purchased in the local two-county area. Table 15 shows the economic impacts associated with work-related expenditures in local communities near the Refuge. For Alternative 1, work-related purchases would generate a total economic impact of 3 jobs, $122.9 thousand in labor income, and $179.3 thousand in value added. Work-related purchases under Alternative 3 would generate the largest total economic impact of 15 jobs, $536.6 thousand in labor income, and $734.4 thousand in value added.

Table 15. Local Economic Impacts of Refuge Related Purchases by Alternative

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternative 1			
Direct effects	2	$76.5	$100.1
Secondary effects	1	$46.4	$79.2
Total economic impact	3	$122.9	$179.3
Alternative 2			
Direct effects	5	$177.4	$212.9
Secondary effects	3	$103.7	$176.3

Total economic impact	8	$281.1	$389.2
Alternative 3			
Direct effects	9	$326.9	$385.5
Secondary effects	6	$209.7	$348.9
Total economic impact	15	$536.6	$734.4
Alternative 4			
Direct effects	4	$165.4	$199.2
Secondary effects	3	$95.1	$162.3
Total economic impact	7	$260.5	$361.5

Summary of Economic Impacts for Alternative 1 (Status Quo)

Table 16 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 1. Under Alternative 1, management activities directly related to Refuge operations generate an estimated 21 jobs, $616.0 thousand in labor income, and $979.5 thousand in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities generate a total economic impact of 35 jobs, $1.1 million in labor income, and $1.8 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 1 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 16. Summary of all Refuge management activities for Alternative 1

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	2	$77.8	$101.9
Total Effects	7	$265.9	$436.8
Non-local Public Use Activities			
Direct effects	19	$538.2	$877.6
Total Effects	28	$847.8	$1,423.8
Aggregate Impacts			
Direct effects	21	$616.0	$979.5

Total effects	35	$1,113.6	$1,860.7

[a.] Staff salary spending and work related purchases

Summary of Economic Impacts for Alternative 2 (Preferred Alternative)

Table 17 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 2. Under Alternative 2, management activities directly related to Refuge operations would generate an estimated 24 jobs, $722.7 thousand in labor income, and $1.1 million in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate a total economic impact of 43 jobs, $1.3 million in labor income, and $2.2 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 2 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 17. Summary of all Refuge management activities for Alternative 2

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	5	$178.8	$214.7
Total Effects	14	$474.2	$737.3
Non-local Public Use Activities			
Direct effects	19	$543.9	$887.1
Total Effects	29	$858.4	$1,441.6
Aggregate Impacts			
Direct effects	24	$722.7	$1,101.8
Total effects	43	$1,332.6	$2,178.9

[a.] Staff salary spending and work related purchases

Table 18 summarizes the change in economic effects associated with Refuge operations under Alternative 2 as compared to Alternative 1. Due to increases in visitation and administration, Alternative 2 would generate 8 more jobs, $219.0 thousand more in labor income, and $318.3 thousand more in value added as compared to Alternative 1.

Table 18. Change in economic impacts under Alternative 2 compared to Alternative 1

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	(+) 3	(+) $100.9	(+) $112.8
Total Effects	(+) 7	(+) $208.4	(+) $300.5
Non-local Public Use Activities			
Direct effects	no change	(+) $5.7	(+) $9.5
Total Effects	(+) 1	(+) $10.6	(+) $17.8
Aggregate Impacts			
Direct effects	(+) 3	(+) $106.7	(+) $122.3
Total effects	(+) 8	(+) $219.0	(+) $318.3

[a.] Staff salary spending and work related purchases

Summary of Economic Impacts for Alternative 3

Table 19 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 3. Under Alternative 3, Refuge management activities directly related to Refuge operations would generate an estimated 22 jobs, $706.0 thousand in labor income, and $1.0 million in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate a total economic impact of 40 jobs, $1.3 million in labor income, and $2.1 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 3 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 19. Summary of all Refuge management activities for Alternative 3

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	9	$328.3	$387.4
Total Effects	21	$729.8	$1,082.5
Non-local Public Use Activities			

Direct effects	13	$377.8	$616.6
Total Effects	19	$600.1	$1,008.2
Aggregate Impacts			
Direct effects	22	$706.0	$1,003.9
Total effects	40	$1,329.9	$2,090.7

[a.] Staff salary spending and work related purchases

Table 20 summarizes the change in economic effects associated with Refuge operations under Alternative 3 as compared to Alternative 1. Due to substantial increases in Refuge administration (including the construction of a boardwalk), Alternative 3 would generate 5 more jobs, $216.3 thousand more in labor income, and $230.0 thousand more in value added as compared to Alternative 1.

Table 20. Change in economic impacts under Alternative 3 compared to Alternative 1

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	(+) 7	(+) $250.4	(+) $285.5
Total Effects	(+) 14	(+) $463.9	(+) $645.6
Non-local Public Use Activities			
Direct effects	(-) 6	(-) $160.4	(-) $261.1
Total Effects	(-) 9	(-) $247.6	(-) $415.6
Aggregate Impacts			
Direct effects	(+) 1	(+) $90.0	(+) $24.4
Total effects	(+)5	(+) $216.3	(+) $230.0

[a.] Staff salary spending and work related purchases

Summary of Economic Impacts for Alternative 4

Table 21 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 4. Under Alternative 4, Refuge management activities directly related to Refuge operations would generate an estimated 9 jobs, $331.4 thousand in labor income, and $469.3 thousand in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate a total economic impact of 20 jobs, $716.8 thousand in labor income, and $1.2 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 4 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon

County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 21. Summary of all Refuge management activities for Alternative 4

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	4	$166.8	$201.0
Total Effects	13	$453.6	$709.5
Non-local Public Use Activities			
Direct effects	5	$164.5	$268.3
Total Effects	7	$263.2	$441.8
Aggregate Impacts			
Direct effects	9	$331.4	$469.3
Total effects	20	$716.8	$1,151.3

[a] Staff salary spending and work related purchases

Table 22 summarizes the change in economic effects associated with Refuge operations under Alternative 4 as compared to Alternative 1. Due to substantial decreases in visitation, Alternative 4 would generate 15 less jobs, $396.8 thousand less in labor income, and $709.4 thousand less in value added as compared to Alternative 1.

Table 22. Change in economic impacts under Alternative 4 compared to Alternative 1

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	(+) 2	(+) $89.0	(+) $99.1
Total Effects	(+) 6	(+) $187.8	(+) $272.7
Non-local Public Use Activities			
Direct effects	(-) 14	(-) $373.7	(-) $609.3
Total Effects	(-) 21	(-) $584.6	(-) $982.1
Aggregate Impacts			
Direct effects	(-) 12	(-) $284.7	(-) $510.2
Total effects	(-) 15	(-) $396.8	(-) $709.4

[a] Staff salary spending and work related purchases

References

Ada County Accounting Department, 2008, September 30, *Comprehensive Annual Financial Report*, accessed online February 27, 2012, at http://www.adaweb.net/LinkClick.aspx?fileticket=rZNNJeWZikQ%3D&tabid=1409

Bureau of Economic Analysis, 2010, *United States Department of Labor: Bureau of Labor Statistics*, accessed on line January 19, 2012, at http://www.bea.gov/regional/region/reis

Bureau of Labor Statistics, 2011a, *United States Department of Labor: Bureau of Labor Statistics, Achived New Releases*, accessed on line January 18, 2012, at http://www.bls.gov/schedule/archives/all_nr.htm#SRGUNE

Carver, E. & Caudill, J., 2007, Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation. U.S. Fish and Wildlife Service, Division of Economics, Washington, DC.

Cauchon, D., 2007, September 28, No End in Sight for Idaho's Growth, *USA Today*.

Chen, D. D., 2000, The Science of Smart Growth, *Scientific American*, 84.

Church, John, 2003, 2003 County Economic Forecast: Historic and Forcast County Population 2000-2003, Idaho Economics, accessed on line Jannuary 22, 2011, at http://www.epa.gov/ttn/naaqs/ozone/areas/pop/pop_proj.htm

City of Nampa Department of Planning and Zoning, 2003, *Employment, a*ccessed on line February 27, 2012, at http://www.cityofnampa.us/revitalization/economy/employment.pdf

Conservation Biology Institute, 2006, Protected Areas Database, compiled using Headwaters Economics Economic profile system-human dimensions toolkit

Goodwin, A., 2003, *Sprawl Threatens Quality of Life, Study Says, a*ccessed on line January 25, 2012, at spokesmanreview.com: http://www.spokesmanreview.com/news-story.asp?date=070703&ID=s1378246

Headwaters Economics, 2008, Economic profile system-human dimensions toolkit (EPS–HDT), available for download online at http://headwaterseconomics.org/tools/eps-hdt, downloaded September 05, 2011

Idaho Department of Labor, 2009, *Idaho Economic Update, a*ccessed on line January 25, 2012, at http://labor.idaho.gov/publications/EconUpdate_Sept_2009.pdf

Idaho Department of Labor, 2011a, *Canyon County: Work Force Trends,* Boise: Idaho Department of Labor.

Idaho Department of Labor, 2011b, *Ada County: Work Force Trends,* Boise: Idaho Department of Labor.

Idaho Department of Labor, 2011c, *Idaho's Job Recovery to Remain Slow in 2011,* Boise: Idaho Department of Labor.

Idaho Division of Financial Management, 2004, *Idaho Economic Forecast,* Boise: Idaho Division of Financial Management.

McMahan, J. B., Weber, K. T., & Sauder, J. D., 2002, Using Remotely Sensed Data in Urban Sprawl and Green Space Analyses, *Intermountain Journal of Sciences*, 30-37.

NASA, 2006, MODIS Land Cover Type, compiled using Headwaters Economics profile system-human dimensions toolkit

Nissan Marine, 2012, Nissan Outboard Fuel Consumption: accessed online March 1, 2012, at *http://www.nissanmarine.com/tech_talk/gas_mileage.html*

Olson, D., and Lindall, S., 1999, IMPLAN professional software, analysis and data guide: Minnesota IMPLAN Group, Inc.

Petrich, C., Wilkins, M., Tondee, C., & Morse, T., 2002, *Western Snake River Plain- Treasure Valley General Description, a*ccessed on line January 24, 2012, at http://imnh.isu.edu/digitalatlas/hydr/snakervr/wsrptvlg.htm

Sexton, N.R., Dietsch, A.M., Don Carlos, A.W., Koontz, L., Solomon, A. and Miller, H., 2012, National Wildlife Refuge visitor survey 2010/2011: Individual refuge results (Deer Flat): U.S. Geological Survey Data Series 643.

Speir, C., & Stephenson, K., 2002, Does Sprawl Cost Us All?: Isolating the Effects of Housing Patterns on PUblic Water and Sewer Costs. *Journal of the American Planning Association*, 56-70.

Stynes, D., 1998. Guidelines for measuring visitor spending: Department of Parks, Recreation and Tourism Resources, Michigan State University.

United States Bureau of Reclamation, n.d., *Lake Lowell, a*ccessed on line January 24, 2012, at http://www.recreation.gov/recAreaDetails.do?contractCode=NRSO&recAreaId=112&agencyCode=129

United States Census Bureau, 1996, *Population Projections for State by Age, Sex, Race, and Hispanic Origin: 1995 to 2025, a*ccessed on line January 23, 2012, at http://www.census.gov/population/www/projections/ppl47.html

United States Census Bureau, 2012, *American FactFinder 2, a*ccessed on line January 18, 2012, at American FactFinder 2: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

United States Department of Agriculture, 2000, *Idaho Natural Resource Trends, a*ccessed on line January 25, 2012, at ftp://ftp-fc.sc.egov.usda.gov/ID/news/nri_97.pdf

United States Department of Agriculture, 2009, *Summary Report: 2007 National Resources Inventory,* Washington D.C.: Natural Resourses Convervation Service and Center for Survey Statistics and Methodology.

United States Fish and Wildlife Service, 2007, *2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Idaho.* U.S. Census Bureau.

United States Energy Information Administration, 2012, Gasoline and Diesel Fuel Update: accessed online March 1, 2012, at http://www.eia.gov/petroleum/gasdiesel/

Appendix A

As mentioned in the Impacts from Public Use and Access Management section, when determining the economic impacts of visitor spending, only spending by non-locals are included in the analysis. This spending generates new income and employment, and has an economic impact on the region. Evaluating it shows the gain to the region from having the Refuge (Carver and Caudill, 2007). In this Appendix, total spending by both locals and non-locals is evaluated to show the significance of visitation to Deer Flat NWR to the local economy under Alternative 1 (Status Quo). As noted by

Carver and Caudill (2007), significance shows the economic activity in a region that is connected to Refuge activities, but does not reflect income and employment that would be lost if the Refuge were not a part of that economy.

Table A shows local and non-local visitation to Deer Flat NWR under Alternative 1. To capture spending by local visitors, we used the spending profiles in Carver and Caudill (2007) for residents for FWS Region 1 and update the 2006 spending profiles to 2011 dollars using the Consumer Price Index Inflation Calculator. Average daily spending profiles for resident visitors to Region 1 for fishing ($40.82 per-day), big game hunting ($41.15 per-day), upland game hunting ($40.54 per-day) and waterfowl hunting ($55.58 per-day) were used to estimate local visitor spending for Refuge fishing and hunting related activities. The average daily resident spending profile for non-consumptive wildlife recreation (observing, feeding, or photographing fish and wildlife) ($33.35 per-day) was used for all non-consumptive wildlife viewing activities including non-priority swimming and beach activities and land-based non-wildlife dependent activities. As described in the Impacts from Public Use and Access Management section, local boater expenditures were e by adding average daily boating fuel expenditure costs ($23.57 per-day) to the average daily resident spending profile for non-consumptive wildlife recreation ($33.35 per-day) from the Banking on Nature report. Total spending by local refuge visitors was determined by multiplying the average local visitor daily spending by the number of local visitor days at the Refuge.

Table A. Estimated Annual Deer Flat NWR Local and Non-local Visitation by Visitor Activity for Alternative 1

Alternative 1	Total number of visits	Number of local visits	Number of non-local visits	Number local visitor days[a]	Number of non-local visitor days[a]
Priority uses					
Fishing	48,430	45,040	3,390	28,150	2,119
Hunting (big game, waterfowl, and other migratory birds)	6,765	6,224	541	4,371	380
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)	93,410	84,069	9,341	31,526	3,503
Non-priority uses					
Non-wildlife dependent boating	55,080	47,920	7,160	29,950	4,475
Swimming and other beach activities	60,290	52,452	7,838	26,226	3,919
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	32,280	28,084	4,196	10,531	1,574
Total Visitation	296,255	263,788	32,467	130,754	15,970

[a] One visitor day = 8 hours

Table B summarizes the total economic significance associated with both local and non-local visitation under the status quo Alternative 1. Under Alternative 1, local and non-local Refuge visitors would spend a combined $7.3 million in the local economy annually. Accounting for both direct and secondary effects, spending by local and non-local visitors for Alternative 1 account for a total economic significance of 88 jobs, $3.3 million in labor income, and $5.5 million in value added in the local two-county area.

Table B. Total Annual Impacts of Local and Non-Local Visitor Spending for Alternative 1

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Local Spending			
Direct effects	55	$1,585.0	$2,566.4
Secondary effects	24	$825.8	$1,470.9
Total economic significance	79	$2,410.8	$4,037.2
Non-local Spending			
Direct effects	19	$538.2	$877.6
Secondary effects	9	$309.6	$546.2
Total economic impact	28	$847.8	$1,423.8
Total economic significance	*88*	*$3,258.5*	*$5,461.0*